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BIOLOGICAL EVALUATION R2-81-4

Mountain Pine Beetle, Dwarf Mistletoe, Comandra Rust in Lodgepole Pine

Roaring Fork and North Fork Drainages, Little Snake River

Medicine Bow National Forest
1981

United States Department of Agriculture

Forest Service

Forest Pest Management
Denver, Colorado

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Biological Evaluation R2-81-4
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Comandra Rust in Lodgepole Pine;
Roaring Fork and North Fork Drainages,
Little Snake River, Medicine Bow
National Forest - 1981

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INTRODUCTION

During aerial reconnaissance surveys in July 1981, an outbreak of the mountain pine beetle (*Dendroctonus ponderosae*) in lodgepole pine was detected in the Roaring Fork and North Fork drainages, Little Snake River. The infestation was light and scattered throughout stands in this area (Figure 1).

On request from the Hayden Ranger District, Medicine Bow National Forest an insect and disease survey was conducted from September 21-25 by FPM, on eight selected stands (Figure 1) to determine:

1. Stand susceptibility to mountain pine beetle (MPB)
2. Incidence of lodgepole pine dwarf mistletoe (DM) (*Arceuthobium americanum*) and comandra blister rust (CR) (*Cronartium comandrae*)

METHODS

Variable radius plot (20 BAF) cruises were conducted in the eight selected stands in the survey area. Cruise lines were run on contours at 5 chain intervals in larger stands and 3 chain intervals in smaller stands. The following parameters were measured at each plot:

1. Diameter of lodgepole pine (d.b.h. to the nearest 0.1 inch) by mountain pine beetle infestation class
    a. uninfested, live
    b. 1981-infested
    c. 1980-infested
    d. snag-infestation date unknown
2. Dwarf mistletoe and comandra rust rating for each lodgepole pine
3. Age and height of one dominant or codominant lodgepole pine (where suitable tree was present) for estimate of site index
4. Diameter (d.b.h. to nearest 0.1 inch) of all aspen, spruce and fir

At each plot center a 1/300-acre circular plot was established to determine the amount of regeneration by tree species and percent of lodgepole pine regeneration infested with dwarf mistletoe.

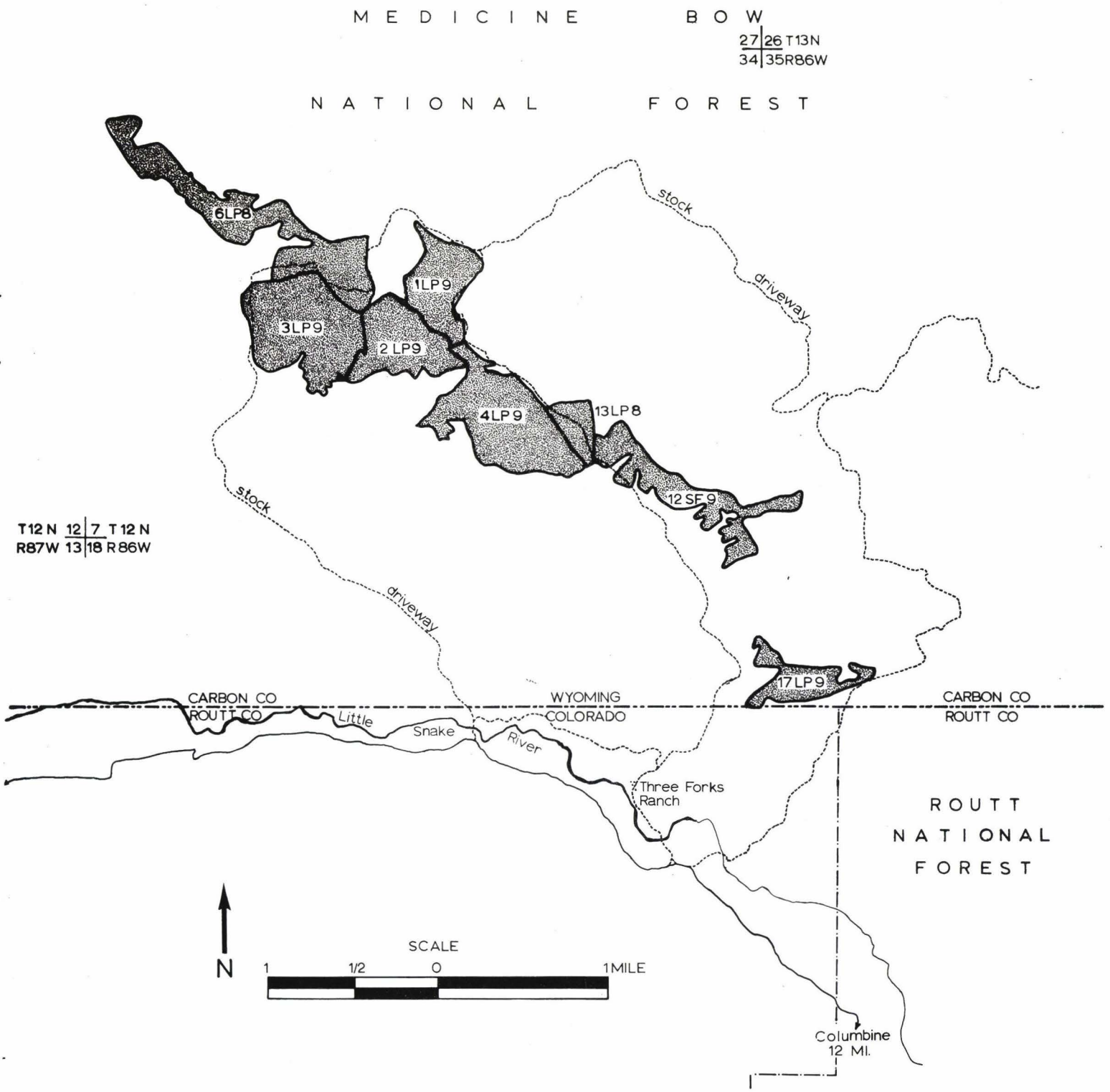


FIGURE 1-Location of stands surveyed during September 21-25, 1981 for insects and diseases on the Medicine Bow National Forest.

Mountain pine beetle susceptibility model -- Stand susceptibility was determined by using the procedure outlined for predicting stand susceptibility by Amman et. al. 1977. This model uses three parameters to determine stand susceptibility: (1) elevation - latitude; (2) average age (years); and (3) average d.b.h. (inches).

Figure 2 was used to determine the risk value for elevation-latitude. At 41° latitude all areas less the 8500 feet in altitude were given a high risk value. This encompassed the entire survey area. Average stand ratings for diameter and age were determined for each stand and given a corresponding risk value according to Table 1. Risk factors were multiplied in succession to determine the overall stand susceptibility. Stand susceptibility classifications are:

Stand Susceptibility classification	Multiplicative risk factor
Low	1 - 9
Moderate	12 - 18
High	27

The model was adjusted by regression[1] analysis to determine the percent of the lodgepole pine trees per stand by susceptibility classification. Linear regression analysis was used to provide an estimator of tree diameter based on age. The following regression estimator was calculated:

$$y = a + bx$$

where Y = estimated tree diameter
x = tree age
a = 6.75
b = 0.07

Using regression analysis to correct the diameter limits based on age 60 and 80, the following individual tree susceptibility ratings were obtained:

Diameter class (inches)	Tree Susceptibility
< 11.0	Low
11.1 - 12.5	Moderate
> 12.5	High

[1] Regression based on site tree data obtained during the evaluation.

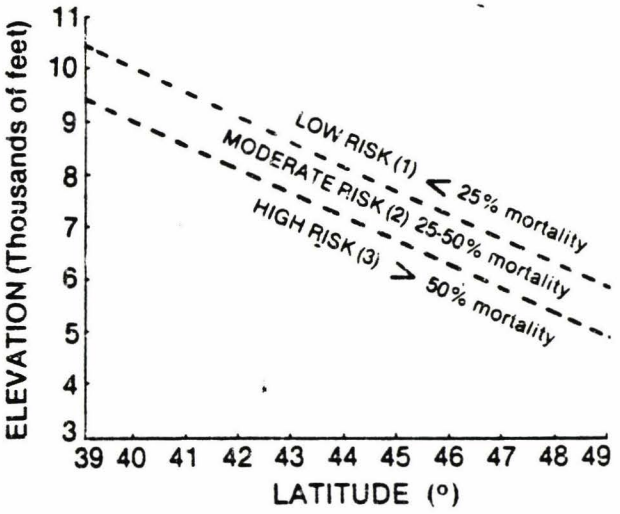


Figure 2 .--Risk of mountain pine beetle infestation in lodgepole pine can be defined by zones of elevation and latitude. Percent mortality is for trees 8.5 inches d.b.h. and larger. (From Amman et. al. 1977)

Table 1. Mountain pine beetle stand risk rating parameters (From Amman et. al. 1977).

Elevation-latitude		*Average age (Years)*		*Average d.b.h. (Inches)*	
High	(1)	<60	(1)	<7	(1)
Moderate	(2)	60-80	(2)	7-8	(2)
Low	(3)	>80	(3)	>8	(3)

Dwarf mistletoe rating (DMR) system -- The 6-class dwarf mistletoe rating system was used to obtain individual tree ratings and average stand ratings (Hawksworth, 1977). Instructions for use of the rating system are given in Figure 3.

Comandra rust rating (CRR) system -- The comandra rust rating system outlined by Brown (1977) was used to obtain individual tree ratings and average stand ratings. Instructions for use of the rating system are given in Figure 4.

RESULTS

Area Summary

A data summary for the entire area is provided in Table 2. This summary emphasizes average stand conditions throughout the area with particular reference to mountain pine beetle, dwarf mistletoe and comandra rust infestation levels. All but one stand surveyed were on excellent sites (site index 80+, basal area 110 sq ft). Although growth rate was declining, in general, these stands are still vigorous. This vigorous condition will make stands less susceptible to mountain pine beetle and continue to provide the opportunity to "outgrow" the impacts of dwarf mistletoe.

Mountain pine beetle, dwarf mistletoe and comandra rust occur in pockets throughout most sampled stands. Average infestation levels for stands are low yet some portions of stands contain epidemic infestation levels of mountain pine beetle. The overall area susceptibility for mountain pine beetle is moderate with nearly 24% of the trees in the area moderately susceptible and 40% highly susceptible to mountain pine beetle attack.

Management Alternatives

1. Do nothing -- accept all losses

2. Sanitation cut -- remove all comandra rust infected trees, dwarf mistletoe infected trees with a DMR >2, and currently infested mountain pine beetle trees. Accept additional losses caused by the mountain pine beetle.

3. Selection cut -- remove all lodgepole pine >12.5 inches d.b.h. to reduce residual stand susceptibility to mountain pine beetle to the low to moderate susceptibility classes.

4. Selection cut -- remove all lodgepole pine >11.0 inches d.b.h. to reduce residual stand susceptibility to mountain pine beetle to the low susceptibility class.

Figure 3. The 6-class mistletoe rating system (Hawksworth 1977).

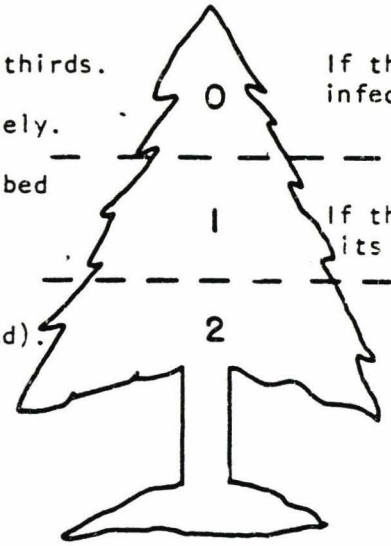
INSTRUCTIONS

STEP 1. Divide live crown into thirds.

STEP 2. Rate each third separately. Each third should be given a rating of 0, 1 or 2 as described below.
(0) No visible infections.
(1) Light infection (1/2 or less of total number of branches in the third infected).
(2) Heavy infection (more than 1/2 of total number of branches in the third infected).

STEP 3. Finally, add ratings of thirds to obtain rating for total tree.

EXAMPLE



If this third has no visible infections, its rating is (0).

If this third is lightly infected, its rating is (1).

If this third is heavily infected, its rating is (2).

The tree in this example will receive a rating of 0 + 1 + 2 = 3.

Figure 4. Comandra rust rating (CRR) System (From Brown 1977)

INSTRUCTIONS

STEP 1. Divide crown (live & dead portions) into thirds

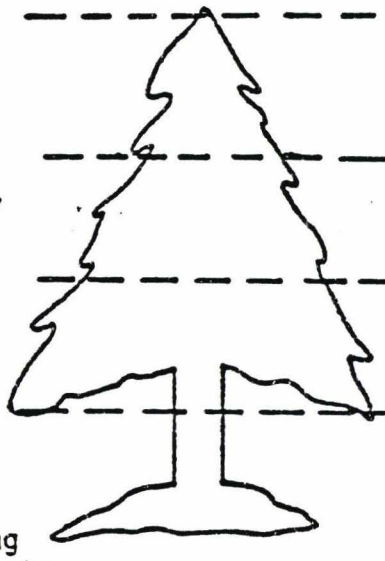
STEP 2. Rate each third separately using only the most serious canker in any third according to the following values:

crown third	non-girdling stem canker	girdling stem canker
upper	1	2
middle	2	4
lower	4	8

When more than one girdling canker occurs on a tree, rate only the lowest one. Cankers located below the live crown are rated the same as the lower third.

STEP 3. Total the ratings for the entire tree.

EXAMPLE



If this third has no visible infection; its' rating is 0

If this third has a girdling stem canker its' rating is 4

If this third has a non-girdling stem canker, its' rating is 4

The tree in this example will receive a total rating of 8

RATING SCALE: 0 - 8

TABLE 2. Data summary of stands in the Roaring Fork, North Fork, Little Snake River Drainages Medicine Bow National Forest

No. Plots	[1]	DIAM. OF LODGEPOLE PINE (d.b.h.-inch) BY MPB INFESTATION CLASS				DISEASE RATING		AGE	HT.		BA
		uninfested	1981 infested	1980 infested	snag	Comandra Rust	Dwarf mistletoe	(Yrs)	(Ft)	SITE	(20 BAF)
	n	283	1	1	17	283	283	43	43		
51	x	12.53	18.2	15.5	10.89	0.05	0.74	78.00	74.58	90	100
	s	4.33			5.84	0.52	1.44	23.20	13.28		

No. Plots		DIAM. OF OTHER SPECIES (d.b.h.-inch) - VARIABLE PLOT			NUMBER OF TREES - 1/300 ACRE PLOTS			
		ASPEN	SPRUCE	FIR	ASPEN	SPRUCE	FIR	LODGEPOLE PINE
	n	55	1	33	51	51	51	51
51	x	8.56	5.3	7.16	1.35	0	1.75	1.35
	s	3.07		3.74	3.21		3.38	3.21

[1] n = number
x = mean
s = standard deviation

5. Clearcut -- where a stand is clearcut in successive entries, remove pockets of lodgepole pine with a DMR >2 in first entry. Successive entries should concentrate on removal of infected trees prior to removal of noninfected trees.

Stand Summaries

Because of the diverse conditions within individual stands, each stand is summarized separately. The effects of alternatives for treatment of mountain pine beetle, dwarf mistletoe and comandra rust are displayed. In those instances where a sanitation or selection cut alternative is selected, follow the suggested criteria for leave tree selection given in figure 5. Alternative 5, (clearcutting) is not displayed.

Stand -- 1LP9. The data summary for stand 1LP9 is given in Table 3. This stand has an average basal area of 120 sq ft (all species) and 100 sq ft for lodgepole pine. Average site index is 90^{+}.

The dwarf mistletoe rating is 1.8 with 55% of all lodgepole pine sampled being infected. Understory lodgepole pine are heavily infected. Comandra rust was not present on any sampled trees.

The average stand susceptibility to mountain pine beetle is currently low. Pockets of moderate to high susceptibility could sustain future losses of up to ca. 45% of the lodgepole pine component of the stand.

The effects of the alternatives are displayed in Table 3. Alternative 2 is recommended because it reduces the DMR to an acceptable level, maintains low stand susceptibility to mountain pine beetle, enhances stand diversity and maintains adequate stocking of all tree species.

Stand -- 2LP9. The data summary for stand 2LP9 is given in Table 4. This stand has an average basal area of 188 sq ft (all species) and 180 sq ft for lodgepole pine. Average site index is 80^{+}.

The dwarf mistletoe rating is 1.6 with 62% of all lodgepole pine sampled being infected. Understory lodgepole pine are heavily infected. Comandra rust was not present on any sample trees.

The average stand susceptibility to mountain pine beetle is currently moderate. This stand could sustain future losses of up to ca. 62% of the lodgepole pine component.

The effects of the alternatives are displayed in Table 4. Alternative 5 (clearcutting) is recommended because it provides for maximum utilization of the resource, eliminates dwarf mistletoe and provides an excellent site for a future high yield lodgepole pine stand.

Figure 5. Suggested criteria for leave tree selection in comandra rust and dwarf mistletoe infested lodgepole pine stands (From Brown 1977).

TREE CONDITION	LEAVE TREE PREFERENCE
1. Apparently disease free	Most desirable
2. DMR of 2 or less (no rust)	
3. Non-girdling rust canker - CRR of 2 or less (no mistletoe)	
a. $\leq$ ½ around circumference	
b. $>$ ½ around circumference	
4. Girdling stem canker - CRR of 4 or less (no mistletoe)	
a. upper 3rd	
b. middle 3rd	
5. Spike top - CRR of 4 or less (no mistletoe)	
a. $\geq$ ½ live crown	
b. $<$ ½ live crown	
6. Cankers in lower 3rd or less than 10' of live crown remaining	
7. Multiple stem cankers	
8. Any rust and DM combination	Least desirable

TABLE 3. STAND SUMMARY FOR STAND 1LP9

ALTERNATIVE	DIAMETER (INCHES) OF LODGEPOLE PINE BY MPB INFESTATION CLASS				DISEASE RATING		AGE	HT	SITE INDEX (CCF)	BA (LP)	DIAMETER OF OTHER TREE SPECIES (INCHES)			(STAND)	NUMBERS OF TREES PER 1/300-ACRE PLOTS				MPB STAND
	UNINFESTED	1981 INFESTED	1980 INFESTED	SNAG	CRR	DMR	(YRS)	(FT)	(125)	SQ FT / AC	ASPEN	SPRUCE	FIR	SQ FT / AC	ASPEN	SPRUCE	FIR	LODGEPOLE PINE	SUSCEPT:
CURRENT STAND	9.9					1.8	43	55	90+	100	10.6			120	1.3			6.8	low
ALTERNATIVE 1	5.1			15.7		1.6					10.6			75	1.3			6.8	low
ALTERNATIVE 2	11.0					0.3					10.6			85	1.3			6.8	low
ALTERNATIVE 3	6.2					1.4					10.6			85	1.3			6.8	low
ALTERNATIVE 4	5.1					1.6					10.6			75	1.3			6.8	low

TABLE 4. STAND SUMMARY FOR STAND 2LP9

ALTERNATIVE	DIAMETER (INCHES) OF LODGEPOLE PINE BY MPB INFESTATION CLASS				DISEASE RATING		AGE	HT	SITE INDEX (CCF) (125)	BA (LP) SQ FT / AC	DIAMETER OF OTHER TREE SPECIES (INCHES)			(STAND) SQ FT / AC	NUMBERS OF TREES PER 1/300-ACRE PLOTS				MPB STAND SUSCEPT.
	UNINFESTED	1981 INFESTED	1980 INFESTED	SNAG	CRR	DMR	(YRS)	(FT)			ASPEN	SPRUCE	FIR		ASPEN	SPRUCE	FIR	LODGEPOLE PINE	
CURRENT STAND	12.1		15.5	18.4		1.6	78	71	80+	180	8.0		5.3	188			2.6	1.4	Mod
ALTERNATIVE 1	9.9			14.0		1.8				85	8.0		5.3	93			2.6	1.4	Mod
ALTERNATIVE 2	12.1					0.8				165	8.0		5.3	173			2.6	1.4	Mod
ALTERNATIVE 3	10.7					1.5				140	8.0		5.3	148			2.6	1.4	Mod
ALTERNATIVE 4	9.9					1.8				85	8.0		5.3	93			2.6	1.4	Mod

Stand -- 3LP9. The data summary for stand 3LP9 is given in Table 5. This stand has an average basal area of 150 sq ft (all species) and 70 sq ft for lodgepole pine. Average site index is 80+.

Dwarf mistletoe and comandra rust were not present on any sample trees.

The average stand susceptibility to mountain pine beetle is currently low. Pockets of moderate to high susceptibility trees could sustain future losses of up to ca. 14% of the lodgepole pine component.

The effects of the alternatives are displayed in Table 5. Alternative 1 is the recommended alternative for the stand since it is primarily aspen-fir type with scattered pockets of lodgepole pine. The lodgepole currently is not large enough for harvest; therefore, no action is needed.

Stand -- 4LP9. The data summary for stand 4LP9 is given in Table 6. This stand has an average basal area of 97 sq ft lodgepole pine. No aspen, spruce or fir were found on the sample plots. Average site index is 80+.

The dwarf mistletoe rating is 2.9 with 93% of all lodgepole pine sampled being infected. Understory lodgepole pine were not infected, probably because there were so few trees. Comandra rust was not present on any sample trees.

The average stand susceptibility to mountain pine beetle is currently high. This stand could sustain future losses of up to ca. 97% of the lodgepole pine component.

The effects of the alternatives are displayed in Table 6. Alternative 5 (clearcutting) is recommended because it provides for maximum utilization of the resource, eliminates dwarf mistletoe and provides an excellent site for a future high yield lodgepole pine stand.

Stand -- 6LP8. The data summary for stand 6LP8 is given in Table 7. This stand has an average basal area of 122 sq ft (all species) and 102 sq ft for lodgepole pine. Average site index is 90+.

The dwarf mistletoe rating is 0.4 with 22% of all lodgepole pine sampled being infected. Understory lodgepole pine are not infected. Comandra rust was not present on any sample trees.

The average stand susceptibility to mountain pine beetle is currently moderate. This stand could sustain future losses of up to ca. 75% of the lodgepole pine component.

The effects of the alternatives are displayed in Table 7. Alternative 5 (clearcutting) is the recommended alternative because it provides for maximum utilization of the resource, eliminates dwarf mistletoe and provides an excellent site for a future high yield lodgepole pine stand.

TABLE 5. STAND SUMMARY FOR STAND 3LP9

ALTERNATIVE	DIAMETER (INCHES) OF LODGEPOLE PINE BY MPB INFESTATION CLASS				DISEASE RATING		AGE	HT	SITE INDEX (CCF)	BA (LP)	DIAMETER OF OTHER TREE SPECIES (INCHES)			(STAND)	NUMBERS OF TREES PER 1/300-ACRE PLOTS				MPB STAND SUSCEPT.
	UNINFESTED	1981 INFESTED	1980 INFESTED	SNAG	CRR	DMR	(YRS)	(FT)	(125)	SQ FT / AC	ASPEN	SPRUCE	FIR	SQ FT / AC	ASPEN	SPRUCE	FIR	LODGEPOLE PINE	
CURRENT STAND	6.1						77	71	80+	70	6.1		15.6	150	3.0		3.0	4.0	Low
ALTERNATIVE 1	4.8									30	6.1		15.6	110	3.0		3.0	4.0	Low
ALTERNATIVE 2	N/A																		Low
ALTERNATIVE 3	4.8									30	6.1		15.6	110	3.0		3.0	4.0	Low
ALTERNATIVE 4	4.8									30	6.1		15.6	110	3.0		3.0	4.0	Low

TABLE 6. STAND SUMMARY FOR STAND 4LP9

ALTERNATIVE	DIAMETER (INCHES) OF LODGEPOLE PINE BY MPB INFESTATION CLASS				DISEASE RATING		AGE	HT	SITE INDEX	BA (LP)	DIAMETER OF OTHER TREE SPECIES (INCHES)			(STAND)	NUMBERS OF TREES PER 1/300-ACRE PLOTS				MPB STAND SUSCEPT.
	UNINFESTED	1981 INFESTED	1980 INFESTED	SNAG	CRR	DMR	(YRS)	(FT)	(CCF) (125)	SQ FT / AC	ASPEN	SPRUCE	FIR	SQ FT / AC	ASPEN	SPRUCE	FIR	LODGEPOLE PINE	
CURRENT STAND	17.5			13.1		2.9	92	81	80+	97				97	1.7		1.5	0.2	High
ALTERNATIVE 1	8.4			17.8		2.0				3				3	1.7		1.5	0.2	Low
ALTERNATIVE 2	16.6					1.4				37				37	1.7		1.5	0.2	High
ALTERNATIVE 3	9.8					3.5				7				7	1.7		1.5	0.2	Mod
ALTERNATIVE 4	8.4					2.0				3				3	1.7		1.5	0.2	Low

TABLE 7. STAND SUMMARY FOR STAND 6LP8

ALTERNATIVE	DIAMETER (INCHES) OF LODGEPOLE PINE BY MPB INFESTATION CLASS				DISEASE RATING		AGE	HT	SITE INDEX (CCF)	BA (LP)	DIAMETER OF OTHER TREE SPECIES (INCHES)			(STAND)	NUMBERS OF TREES PER 1/300-ACRE PLOTS				MPB STAND SUSCEPT.
	UNINFESTED	1981 INFESTED	1980 INFESTED	SNAG	CRR	DMR	(YRS)	(FT)	(125)	SQ FT AC	ASPEN	SPRUCE	FIR	SQ FT AC	ASPEN	SPRUCE	FIR	LODGEPOLE PINE	
CURRENT STAND	14.0			6.7		0.4	77	75	90+	102	10.9		4.9	122	0.6		4.3	1.8	Mod
ALTERNATIVE 1	8.5			15.8		0.1				26	10.9		4.9	46	0.6		4.3	1.8	Low
ALTERNATIVE 2	13.9					0.3				100	10.9		4.9	120	0.6		4.3	1.8	Mod
ALTERNATIVE 3	9.7					0.1				42	10.9		4.9	62	0.6		4.3	1.8	Mod
ALTERNATIVE 4	8.5					0.1				26	10.9		4.9	46	0.6		4.3	1.8	Low

Stand -- 13LP8. The data summary for stand 13LP8 is given in Table 8. This stand has an average basal area of 230 sq ft (all species) and 30 sq ft for lodgepole pine. Average site index is 60^{+}.

Dwarf mistletoe and comandra rust were not present on any sample trees.

The average stand susceptibility to mountain pine beetle is currently high. This stand could sustain future losses of up to ca. 67% of the lodgepole pine component.

The effects of the alternatives are displayed in Table 8. Alternative 5 (clearcutting) is the recommended alternative for the lodgepole pine component of this stand. Essentially this would convert the stand to aspen-fir.

Stand -- 17LP9. The data summary for stand 17LP9 is given in Table 9. This stand has an average basal area of 135 sq ft (all species) and 120 sq ft of lodgepole pine. Average site index is 80^{+}.

Dwarf mistletoe was not present in any of the sample trees. The comandra rust rating is 0.3 with 7% of all trees sampled being infected.

The average stand susceptibility to mountain pine beetle is currently moderate. This stand could sustain future losses of up to ca. 55% of the lodgepole pine component.

The effects of the alternatives are displayed in Table 9. Alternative 5 (clearcutting) is the recommended alternative because it provides for maximum utilization of the resource, eliminates comandra rust and provides an excellent site for a future high yield lodgepole pine stand.

Stand -- 21SF9. The data summary for stand 21SF9 is given in Table 10. This stand has an average basal area of 150 sq ft (all species) and 114 sq ft for lodgepole pine. Average site index is 90^{+}.

Dwarf mistletoe and comandra rust were not present on any of the sample trees.

The average stand susceptibility to mountain pine beetle is currently moderate. This stand could sustain future losses of up to 60% of the lodgepole pine component.

The effects of the alternatives are displayed in Table 10. Alternative 5 (clearcutting) is the recommended alternative because it provides for maximum utilization of the resource and provides an excellent site for a future high yield lodgepole pine stand.

TABLE 8. STAND SUMMARY FOR STAND 13LP8

ALTERNATIVE	DIAMETER (INCHES) OF LODGEPOLE PINE BY MPB INFESTATION CLASS				DISEASE RATING		AGE	HT	SITE INDEX (CCF)	BA (LP)	DIAMETER OF OTHER TREE SPECIES (INCHES)			(STAND)	NUMBERS OF TREES PER 1/300-ACRE PLOTS				MPB STAND SUSCEPT.
	UNINFESTED	1981 INFESTED	1980 INFESTED	SNAG	CRR	DMR	(YRS)	(FT)	(125)	SQ FT AC	ASPEN	SPRUCE	FIR	SQ FT AC	ASPEN	SPRUCE	FIR	LODGEPOLE PINE	
CURRENT STAND	12.2						110	61	60+	30	10.7		7.3	230	1.0		4.0		High
ALTERNATIVE 1	3.8			16.3						10	10.7		7.3	210	1.0		4.0		Low
ALTERNATIVE 2	N/A																		
ALTERNATIVE 3	3.8									10	10.7		7.3	210	1.0		4.0		Low
ALTERNATIVE 4	3.8									10	10.7		7.3	210	1.0		4.0		Low

TABLE 9. STAND SUMMARY FOR STAND 17LP9

ALTERNATIVE	DIAMETER (INCHES) OF LODGEPOLE PINE BY MPB INFESTATION CLASS				DISEASE RATING		AGE	HT	SITE INDEX (CCF)	BA (LP)	DIAMETER OF OTHER TREE SPECIES (INCHES)			(STAND)	NUMBERS OF TREES PER 1/300-ACRE PLOTS				MPB STAND SUSCEPT.
	UNINFESTED	1981 INFESTED	1980 INFESTED	SNAG	CRR	DMR	(YRS)	(FT)	(125)	SQ FT / AC	ASPEN	SPRUCE	FIR	SQ FT / AC	ASPEN	SPRUCE	FIR	LODGEPOLE PINE	
CURRENT STAND	11.5	18.2		7.0	0.3		79	75	80+	120	4.8		6.6	135	0.3		0.1	0.1	Mod
ALTERNATIVE 1	8.9			13.4	0.3					53	4.8		6.6	68	0.3		0.1	0.1	Low
ALTERNATIVE 2	11.5									113	4.8		6.6	128	0.3		0.1	0.1	Mod
ALTERNATIVE 3	9.8				0.1					80	4.8		6.6	95	0.3		0.1	0.1	Mod
ALTERNATIVE 4	8.9				0.3					53	4.8		6.6	68	0.3		0.1	0.1	Low

TABLE 10. STAND SUMMARY FOR STAND 21SF9

ALTERNATIVE	DIAMETER (INCHES) OF LODGEPOLE PINE BY MPB INFESTATION CLASS				DISEASE RATING		AGE	HT	SITE INDEX (CCF)	BA (LP) SQ FT / AC	DIAMETER OF OTHER TREE SPECIES (INCHES)			(STAND) SQ FT / AC	NUMBERS OF TREES PER 1/300-ACRE PLOTS				MPB STAND SUSCEPT.
	UNINFESTED	1981 INFESTED	1980 INFESTED	SNAG	CRR	DMR	(YRS)	(FT)	(125)		ASPEN	SPRUCE	FIR		ASPEN	SPRUCE	FIR	LODGEPOLE PINE	
CURRENT STAND	11.9			8.0			80	79	90+	114	7.8		10.0	150	0.2		0.7	0.5	Mod
ALTERNATIVE 1	8.8			13.6						46	7.8		10.0	82	0.2		0.7	0.5	Low
ALTERNATIVE 2	N/A																		
ALTERNATIVE 3	9.8									69	7.8		10.0	105	0.2		0.7	0.5	Mod
ALTERNATIVE 4	8.8									46	7.8		10.0	82	0.2		0.7	0.5	Low

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